

II, and two similar pair between coxae III. VENTRAL SETAE: About 36 thin frayed setae in horse-shoe shaped rows of 10-8-8-(?), the sinus of each row facing caudad; the more posterior setae somewhat longer and stouter than more anterior. LEGS: I—0.26 mm; II—0.25 mm; III—0.27 mm. Sensory setae as follows: I—1 spur, 2 genualae, 1 microtibiala, 1 subterminala, 1 microspur, 1 microgenuala, 2 tibialae. II—1 spur, 1 genuala, 2 tibialae. III—1 genuala and 1 tibiala. TARSAL CLAWS: Outer claws elongate, acuminate, curved, resembling the blade of a scythe; proximal portion of empodium subequal to diameter of claw, expanded portion of empodium about 4-5 times diameter of claw.

Type material.—Holotype (U. S. A. Typhus Commission no. 718-1) deposited in U. S. National Museum. One paratype in collection of British Museum of Natural History.

Records.—Holotype and paratype from a weaver-finch (*Ploceus manyar peguensis* Stuart Baker); 20 miles northwest of Myitkyina, on Mogaung Road, February 23, 1945, collected by United States of America Typhus Commission.

Remarks.—The genus is named for Col. T. T. Mackie, M.C., who was in command of the India-Burma Field Party of the United States of America Typhus Commission. Capt. Roy T. Melvin of that organization first recognized the generic status. I am deeply indebted to Dr. H. S. Fuller, of the Harvard School of Public Health, who examined *Riedlinia coeca* in the Oudemans collection and who kindly allowed me to use his notes concerning this species. Dr. G. W. Whar-ton, of the Department of Zoology, Duke Uni-versity, was instrumental in transmitting Dr. Fuller's notes to me.

STANDARD MEASUREMENTS

Slide No.	AW	PW	SB	ASB	PSB	A-P	AM	AL	PL	SENS	DS
718-1 (holotype).....	56	76	37	21	21	19	46	84	66	30	56
718-2 (paratype).....	57	78	38	—	—	—	42	84	67	—	63
Mean.....	56	77	38	21	21	19	44	84	67	30	60

ZOOLOGY.—A new copepod, *Pseudanthessius latus* (*Cyclopoida: Lichomolgidae*), commensal with a marine flatworm.¹ PAUL L. ILLG, U. S. National Museum (Communicated by FENNER A. CHACE, Jr.)

For some years there has been on record the existence of a copepod ectocommensal of very large marine flatworms found on the Pacific coast of the United States. Identified by Wilson, 1935, as *Pseudanthessius obscurus* Scott, several specimens have been pre-served in the National Museum. Since that date additional specimens have been added to the collection by the original collectors, Mr. and Mrs. G. E. MacGinitie. Other spec-imens have been seen and collected from Pu-get Sound by the author and by Dr. Frank A. Pitelka. Detailed study of the specimens available demonstrates them to represent a new species, well differentiated from the re-maining members of the genus. Nicholls, 1944, provided a key to the species known

to that date and pointed out the necessity for exclusion of some incorrectly assigned species. Since this treatment there has appeared the descriptions of 2 new species, *P. gracilioides* Seymour Sewell, 1949, and *P. spinifer* Lindberg, 1946. Accordingly, Nicholls's key, with modification to provide for the 3 subsequently found species, is presented below as a concise differentiation of the various forms.

Family LICHOMOLGIDAE Claus, 1889

Pseudanthessius Claus, 1889; Nicholls, 1944

The genus is very close to *Lichomolqus*. The salient differentiating character is the re-duced fifth foot, consisting of only a spine and two setae, originating directly from the body proper, all other vestige of the appendage as free outgrowth having been completely sup-pressed.

¹ Published by permission of the Secretary of the Smithsonian Institution. Received December 2, 1949.

KEY TO SPECIES OF PSEUDANTHESIIUS

[Modified after Nicholls, 1944]

1. Outer margin of fourth endopodite entire, simply convex.....2
 - Outer margin of fourth endopodite sinuate, broken by a swelling or indentation which may become a conspicuous knob or notch...4
2. Lateral margins of genital segment produced into conspicuous expansions
 - spinifer* Lindberg, 1946
 - Lateral margins of genital segment not conspicuously expanded.....3
3. Caudal rami twice as long as wide, little longer than anal segment
 - liber* (Brady and Robertson, 1875)
 - Caudal rami three times as long as wide, one-third as long again as anal segment
 - assimilis* Sars, 1917
4. Greatest width of fourth endopodite over one-half length.....*latus*, n. sp.
- Greatest width of fourth endopodite less than one-half length.....5
5. Caudal rami twice as long as wide
 - sauvagei* Canu, 1891
 - Caudal rami more than twice but not more than four times as long as wide.....6
 - Caudal rami more than four times but not more than seven times as long as wide.....8
 - Caudal rami at least 10 times as long as wide 9
6. Fourth endopodite with marked notch at proximal third; segments of first antenna short and compact; genital segment not greatly dilated.....*obscurus* A. Scott, 1909
- Fourth endopodite with notch or constriction at center; segments of first antenna normal; genital segment considerably dilated.....7
7. Second thoracic segment with posterior projections; fourth endopodite no longer than basal segment of exopodite, with proximal bulge but no notch. *mucronatus* Gurney, 1927
- Second thoracic segment without posterior projections; fourth endopodite longer than basal segment of exopod and with a distinct notch.....*tenuis* Nicholls, 1944
8. Fourth endopodite with marked notch at about center; less than four times as long as wide.....*gracilis* Claus, 1889
- Fourth endopodite with notch at center; more than five times as long as wide
 - gracilioides* Sewell, 1949
 - Fourth endopodite with slight notch at center and proximal bulge; caudal rami five times as long as wide.....*weberi* A. Scott, 1909
 - Fourth endopodite without notch but with slight proximal bulge; caudal rami four to four and one-half times as long as wide
 - nemertophilus* Gallien, 1935
9. Last two segments of urosome subequal.....10
- Anal segment at least twice as long as preanal
 - thorelli* (Brady and Robertson, 1875)
10. Caudal rami about as long as last two segments of urosome together.....*dubius* Sars, 1918
- Caudal rami about as long as last three segments of urosome together
 - concinus* Thompson and Scott, 1903

Pseudanthessius latus, n. sp.

Pseudanthessius obscurus C. B. Wilson, 1935, p. 780, pl. 27, fig. 36.

Specimens examined.—12 females, 8 males, all adult; Anaheim Slough, Calif.; surface of large gray flatworm; October 22, 1937; G. E. MacGinitie.

1 female; adult; San Juan Island, Wash.; surface of large flatworm; July, 1939; Paul L. Illg.

6 females, one male, all adult; Santa Ana River, Calif.; backs of large flatworms; December 11, 1932; G. E. MacGinitie. (Recorded as *P. obscurus* Scott, Wilson, 1935.)

9 females, adult; Turn Rock, near San Juan Island, Wash.; surface of large flatworms (*Cryptophallus magnus* Freeman); July 2, 1940; F. A. Pitelka.

Types.—Holotypic female, U.S.N.M. no. 90285; allotypic male no. 90286; locality Anaheim Slough, Calif.; scientific name of flatworm host not known. The remainder of the specimens examined are designated paratypes.

Description.—Female (Figs. 1, *a-k*): Body length 1.82 mm. Body form (Fig. 1, *a*) typically lichomolgid but with conspicuous broadening of the metasome, producing an anterior body region of suborbicular outline. There is no rostrum. The thoracic segment bearing the first swimming legs is fused into the cephalothoracic portion of the metasome. The segments of the second to fourth swimming legs are free, that of the second legs much the widest, that of the third legs longer than the others. The segment of the fifth legs is sharply set off both from the metasome and the genital segment. The urosome, including the segment of the fifth legs, is 5-segmented. The genital segment is much dilated anteriorly, thus being considerably wider than long. The three free abdominal segments are subequal in length, each slightly longer than wide. The caudal rami are at least 1½ times as long as the anal segment. The longest seta of each caudal ramus is longer than the combined lengths of the free abdominal segments and rami. The ovisacs are elongate, slender cylinders, carried closely appressed to the abdomen, and, in most cases, slightly exceeding the tips of the caudal rami. The eggs are minute and a rough estimate would indicate there are upwards of 300 eggs in each ovisac. The general body aspect is neat and trim and the proportions achieve a fairly graceful symmetry.

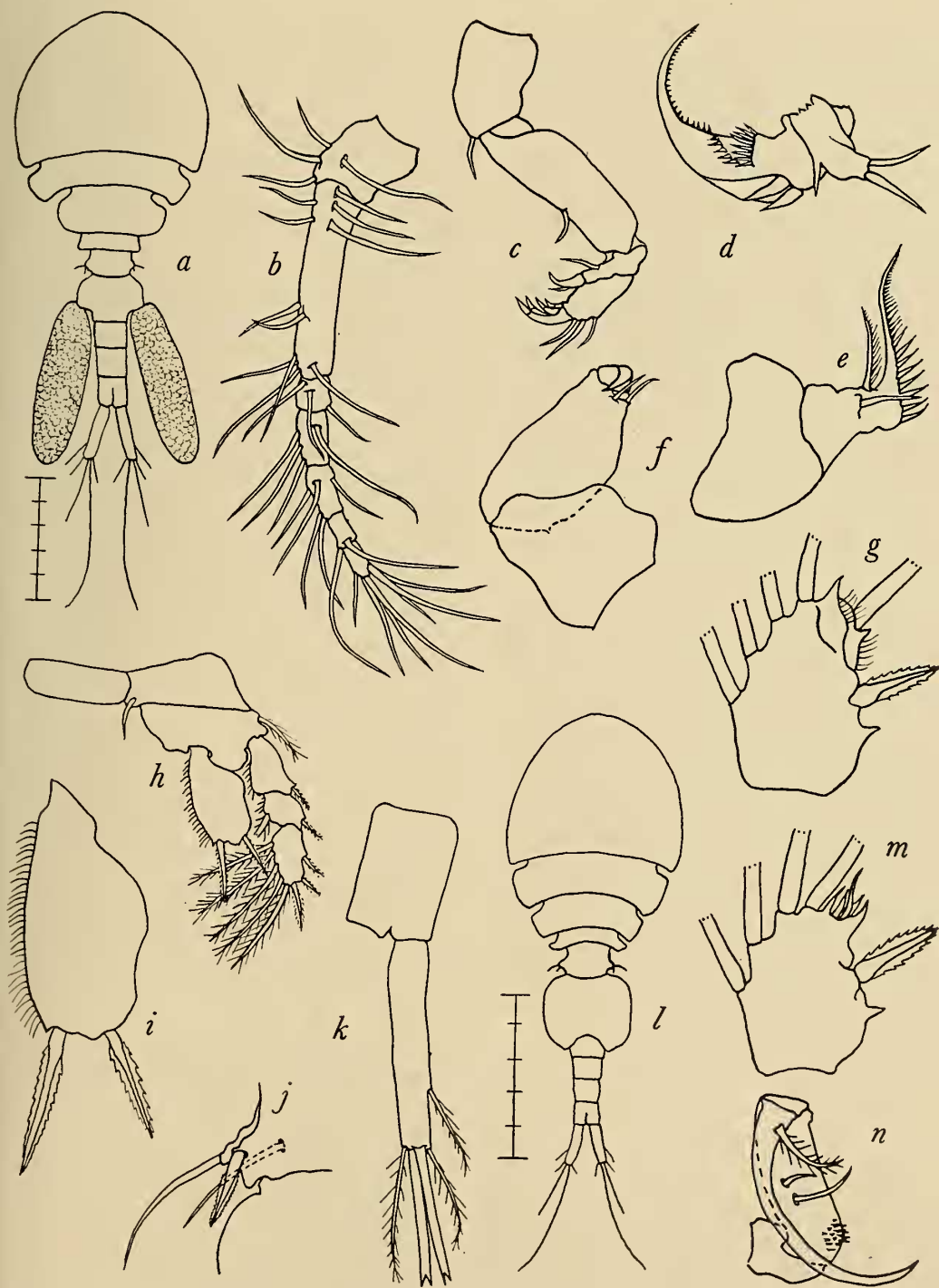


FIG. 1.—*Pseudanthessius latus*, n. sp. Female: *a*, Dorsal view; *b*, antennule; *c*, antenna; *d*, mandible and maxillule in posterior view so that maxillule appears as superimposed upon mandible; *e*, maxilla; *f*, maxilliped; *g*, distal segment of first endopodite; *h*, fourth swimming leg; *i*, fourth endopodite; *j*, fifth leg; *k*, caudal ramus. Male: *l*, Dorsal view; *m*, terminal segment of first endopodite; *n*, maxilliped. The scales referring to dorsal views of male and female represent 0.5 mm.

Antennule (Fig. 1, *b*) rather elongate, of the usual seven segments. The relative proportions of the segments are distinctive. The elongate second segment exceeds the combined lengths of the five terminal segments and provides a character by which the species may be readily identified. The setation is represented in the figure. The antenna (Fig. 1, *c*) is the usual 4-segmented prehensile appendage. There is a single seta borne terminally on the basal segment. The second segment bears a single subterminal seta. The third segment has a diagonal articulation with the fourth segment and is produced considerably along the medial margin of the terminal segment. At the apex of the produced portion is set a prehensile claw, accompanied by two slender, short setae. The fourth segment is somewhat longer than broad. On its distal margin there is a closely set group of four subequal, lineally graduated, jointed claws, accompanied by three slender setae. None of the setae or claws is as long as the segment.

The mandible (Fig. 1, *d*) is the usual flat blade, produced into an elongate, tapering tip. Its distinctive ornamentation consists of two broad, chitinated flaps basally on the outer margin, and a row of spinules which are set along the inner curve from the tip to about midway on the length of the blade. Here the spines become long and stout and are set across the posterior surface of the mandible along two sides of a triangular outline. The base of the mandible is closely associated with the base of the maxillule (Fig. 1, *d*). The maxillule is a thin flap, its margin incised deeply medially to produce a long spiniform process. Terminally the flap narrows to a short, truncate apex on which is borne two relatively long subequal setae.

The maxilla (Fig. 1, *e*) is not particularly distinctive, conforming to that found in a number of lichomolgids. It is 2-segmented. The terminal segment tapers to a long, perpendicularly bent lash. This bears along its margin, medial in normal orientation on the animal, a regular row of elongate spinules, these diminishing in length and stoutness apically. There are two accessory setae on the base of this terminal segment. The shorter, which is unornamented, lies appressed to the surface of the basal portion of the second segment and parallel to the long axis of the basal portion. The second bears a single row of cilia along its medial margin and is set on the anterior edge of the basal part of the segment so that it extends parallel with the lashlike distal extension of the segment.

The maxilliped (Fig. 1, *f*) is very stout. There are two subequal proximal segments. Articulated on the apex of the second segment is a pronouncedly tapered, much reflexed claw. This may be a third segment or simply an articulated spine. It is provided with an extensive musculature. Accompanying the articulated spine are two short, slender setae, borne apically on the second segment.

The arrangement of the spines and setae on the four pairs of legs follows. The count of spines is presented in Roman numerals, that of the setae in Arabic. The segments of each ramus are designated in order from the basal segment distally. First exopodite I-0; I-1; IV-4; endopodite O-1; O-1; I-5. Second exopodite I-0; I-1; IV-5; endopodite O-1; O-2; III-3. Third exopodite I-0; I-1; IV-5; endopodite O-1; O-2; III-2. Fourth exopodite I-0; I-1; III-5; endopodite 1-segmented, with two terminal spines.

The endopodite of the fourth leg (Fig. 1, *h*) is distinctive in its considerable inflation of outline. From a basal articulation of proportions equivalent to those in the other endopodites it flares in a steep curve to a width nearly $2\frac{1}{2}$ times that of the articulating margin, then diminishes along a sigmoid curve to a truncate apex which is still of relatively broad amplitude. There is no indentation of the integument of the lateral margin. The medial margin is finely ciliate. Distally there are borne two well-separated spines, of subequal dimensions. The medial spine is slightly longer than the other.

The fifth leg (Fig. 1, *j*) is reduced to a spine and two setae which originate directly from the lateral margin of the thoracic somite, as a result of complete suppression of the segments of the appendage. The spine is ventral and directed posteriorly. One seta is lateral, the other on the dorsal side; both are directed mainly laterally, but curve gently posteriorly. The caudal rami (Fig. 1, *k*) are long and slender, between five and six times as long as wide, somewhat divergent posteriorly. Each bears the usual complement of a short lateral plumose seta and four terminal plumose setae.

Male (Fig. 1, *l*): body length 1.55 mm. Metasome much slenderer than in the female, but of corresponding segmentation. The somite of the fifth swimming legs is more elongate than that of the female but equally markedly delimited from the adjoining segments. The urosome consists of six segments. The first abdominal segment is considerably enveloped anteriorly by the genital somite. The genital segment is laterally

expanded to a subquadrate outline. The width exceeds the length. The four abdominal segments are subequal in length.

The appendages conform in the main to those of the female. The usual dimorphism characteristic of the lichomolgids is exhibited in the transformation of the maxilliped into a prehensile structure (Fig. 1, *n*), in the presence of sixth legs, and in the segmentation of the urosome. A further manifestation of dimorphism is seen in the alteration of the terminal segment of the first endopodite. In the female this segment bears a short lateral spine and five well-developed, plumose setae (Fig. 1, *g*). The male condition is the result of the suppression of the most lateral of the setae (Fig. 1, *m*). Here there are only four normally developed setae. The shape of the entire segment is altered somewhat and at the point which would normally support the fifth seta there are several spinose projections of the integument among which stands a short, slender wisp, which may represent an extreme reduction of the seta found in the female. A similar tendency to dimorphism in the swimming legs occurs in other lichomolgids and may offer a prospect of convenient specific differentiation in some cases.

Remarks.—The host of the present species, a marine polyclad (possibly more than one species), is an addition to the diverse roster of hosts of the genus. Previously recorded associates have been annelids, mollusks, echinoids, and a nemertean. Many of the records of the occurrence of species of the genus have been based on planktonic samplings. Continued free existence of these individuals would be most unlikely in view of the extreme specialization of the mouthparts

which are unsuited to the capture of any motile organism and probably incapable even of seizure of free-floating particles. A varying degree of tenacity in adhering to the host on the part of these copepods must explain the relatively large number of species for which no host record has yet been established. In the present instance most specimens so far found have shown a marked inclination to adhere to the surface of the worm and many have so remained after hours of tumbling about in the diverse lot of materials obtained from several dredge hauls.

The specific differentiation of *Pseudanthessius latus* is readily established on characters consistent in both sexes. The fourth endopodite is highly distinctive, as is the elongation of the second antennular segment and both features are readily determinable under a low degree of microscopic magnification.

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MAMMALOGY.—*Notes on microtine rodents from the Brooks Range, Arctic Alaska.*¹

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In connection with parasitological studies carried on during 1949 for the U. S. Public Health Service, the writer collected a considerable number of mammals from the northern edge of the "Endicott" section of the Brooks Range, in Arctic Alaska. The mammalian fauna of this region is poorly known, since apparently no previous collecting has been done here. About 200 microtine rodents were collected, mostly near Tolugak

Lake (lat. 68° 24' N., long. 151° 26' W.), near the head of the Anaktuvuk River Valley. A few specimens were also taken at Umiat, on the Colville River, about 80 miles north of Tolugak Lake (lat. 69° 23' N., long. 152° 10' W.). Five species are represented. More complete details concerning their ecology and reproduction will be presented in a later paper, at which time the other mammals obtained will also be considered. The specimens have been deposited in the U. S. National Museum.

¹Received January 18, 1950.